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Dr. Peninah Tanui Melly, Mr. Stephen Kimei & Prof. Arnety Nangila Makokha

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Digital Financial Inclusion and Economy Growth in Kenya: Banking Sector's Efficiency and Competition Interaction Analysis

[*1]Dr. Peninah Tanui Melly, [2]Mr. Stephen Kimei & [3]Prof. Arnety Nangila Makokha

[1,2,3]Alupe University, Kenya

***Email of the Corresponding Author: tanuipenina@gmail.com**

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Abstract

The main purpose of the study was to investigate the interaction effects of both banking sector's efficiency as well as competition in the relationship between digital financial inclusion and economic growth. Positivist research paradigm and cross-sectional survey research design was adopted. A sample size of 384 respondents was drawn from the target population distributed across the four County governments in the Kenya's Western Province. Structured questionnaires and document analysis research instruments yielded data that was subjected to descriptive, Pearson correlation and hierarchical regression analysis. From the findings, digital financial inclusion measured based on account ownership and use of financial service indicators was found to positively and significantly improve economic growth. On the other hand, banking sector efficiency as well as competition each separately moderated significantly the relationship between digital financial inclusion and economic growth. Moreover, the results outlined a combined moderating effect of banking sector efficiency and competition given the nexus between digital financial inclusion and economic growth. The findings of the study have implication for not only practice and policy but also to theory, social and future research. In the recent past, technology advancement has amplified the use of digital financial services amid the increased efficiency and competition concerns in the banking sector. The study therefore contributes significantly to the existing body of knowledge as it examines the relationship between digital financial inclusion and economic growth taking into consideration the joint moderation effects of banking sector efficiency and competition.

Keywords: *Digital, Financial Inclusion, Economy Growth, Banking Sector's, Efficiency, Competition Interaction Analysis*

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1.0 Introduction

In the new global economy, digital financial services have become a vital issue that is growing rapidly (Van Niekerk & Phaladi, 2020). As such, the global rise of digital financial services has arose due to financial technology (FinTech), fourth industrial revolution technologies (Mpofu, 2024) and the Covid-19 pandemic (Neves, Oliveira, Santini, & Gutman, 2023; Tay, Tai, & Tan, 2022). Indeed, digital finance is vital given electronic commerce (e-commerce) and presence of FinTech (Risman, Mulyana, Silvatika, & Sulaeman, 2021). Notably, as pointed out by Mpofu (2024), digitization of financial industry has led to the modification of diverse financial services with the sole aim of reducing the access cost besides addressing the obstacles arising due to inaccessibility given the remote areas and erratic income, lack of bank accounts as well as credit history. Moreover, the less privileged especially in developing countries can access banking services that are not only suitable and reasonable but also secure (Rana, Luthra, & Rao, 2020). According to the World Bank Group (2025), access to finance in Sub Saharan Africa has been expedited though mobile money adoption. Generally, World Bank Group puts forth that 76% of the adult population globally as of 2021 managed to own accounts due to expansion of digital financial services.

In Kenya, the banking sector comprises of the main regulator Central Bank of Kenya (CBK) and other key players. These include commercial banks, mortgage finance company, mortgage refinance company, representative offices of foreign banks, microfinance banks, credit reference bureaus, money remittance providers, non-operating bank holding companies, digital credit providers and foreign exchange bureaus (CBK, 2024). According to the FinAccess household survey report led by the CBK with other partners, financial sectors growth in Kenya is strong with its immense contribution toward the country's gross domestic product (GDP). Kenya thus is seen to be at the forefront in East Africa as far as digital financial services is concerned (Raji, 2020). For instance, there is successful use of digital credit that help reach out to those individuals excluded from access to formal loans or due to their low socioeconomic status (Kim & Duvendack, 2024). Furthermore, through digital financial services, there has been enhanced financial performance (Musa & Njeru, 2023) and growth (Awinja & Fatoki, 2021), quicker transactions and improved management of cash flows (Njagi, 2024) among the small and medium enterprises (SMEs). More importantly, Kenya has realized numerous paybacks arising from the mobile platforms such as progress of economic growth alongside the realization of digital financial inclusion (Mulili, 2022). Other benefits include reduction of poverty and inequality, increase of access to banking services, increase in empowerment, improved financial resilience and livelihoods (Tiony, 2023). Therefore, given all these fundamental roles, digital financial services regulation is in place so as to create a conducive environment for stakeholders, spearhead financial inclusion and intermediation not only in Kenya but East Africa at large (Kenya Bankers Association, KBA, February 2023).

Ideally, self-sufficiency of the vulnerable sections can make a country to develop economically and socially (Kandpal, Chandra, Dalei, & Handoo, 2023). Thus, digital financial services have been found to be significant in advancing financial inclusion (Khera, Ogawa, & Sahay, 2021; Risman et al., 2021; Shofawati, 2019). In this regard, financial inclusion relates to the ability of individuals as well as business to access and use affordable financial products and services to fulfil their needs (World Bank Group, 2025). As for Mulili (2022), financial inclusion occurs given that the proportion of the people in the country have access to reasonable, convenient and appropriate formal financial services. Regardless of the barriers as distance, cost (Girón, Kazemikhasragh,

Cicchiello, & Panetti, 2021), inadequate documentation, nonexistence of finance and of trust (Bekele, 2023; Girón et al., 2021), financial inclusion continue to enhance productivity, create employment opportunities, boost inclusive and sustainable economic growth (World Bank Group, 2025). Additionally, financial inclusion enhances SMEs' growth (Umar, Baita, Hamadou, & Abduh, 2025), attainment of sustainable development goals (SDGs), reduction of poverty, support business expansion through access to credit, capital, efficient payment services and secure savings (World Bank Group, 2025).

As pointed out by (Mpofu, 2024), digital financial inclusion promotes financial inclusion of all stakeholders which include individuals, businesses and households. Digital financial inclusion purposes to make digital financial services available and affordable to all irrespective of their cost, institution size or demographic location (Lutfi et al., 2021). This is possible given the promotion of financial services access to underdeveloped regions (Xi & Wang, 2023), excluded population segments (Mpofu, 2024; Mulili, 2022) via digital channels and platforms. In the recent past, digital financial inclusion is known to be the achievement of goals relating to financial inclusion (Yang, Shi, & Wu, 2022). Consequently, there has been notable transformative changes as a result of digital financial inclusion (Xi & Wang, 2023). Empirically, digital financial inclusion has been positively linked to economy growth based on data of numerous countries in the world (Shen, Hu, & Hueng, 2021), developing countries (Khera et al., 2021), China (Xi & Wang, 2023), Bangladesh (Rahman, Chowdhury, & Sristi, 2025) and among Asian countries at large (Ramesh Hegde & Guruprasad, 2024). In Africa, there exist a positive relationship between digital financial inclusion and economic growth given African countries (Chinoda & Mashamba, 2021), Sub Saharan countries (Chinoda & Kapingura, 2024; Ugwuanyi et al., 2022) and among countries under the Sothern Africa Development Community, SADC (Meniago, 2025).

There are numerous drivers of digital financial inclusion from the existing literature. At the outset, these key drivers include urbanization, mobile penetration and banking system conditions (Sha'ban, Ayadi, Forouheshfar, Challita, & Sandri, 2024). Moving on, Song, Jing, and Akebaerjiang (2020) documented determinants as internet penetration, government intervention, credit market development, government intervention and the level of economic development. On the other hand, educational level, market participation, access to technology, internet infrastructure and labor market have been found to drive digital financial inclusion (Elouaourti & Ibourk, 2024). In order to foster financial inclusion as a way of promoting sustainable development, there is need to consider enablers as empowerment, diversity, leadership, protection, innovation, cooperation, knowledge, framework and proportionality (Tay et al., 2022). In the same breadth, digital financial inclusion is driven by the macroeconomic development, socio economic factors, financial sector efficiency, financial stability, governance and institutional quality (Khera et al., 2021). In the modern times, efficiency is key as value is sought given the inputs and outputs. Moreso, there exist a cut-throat competition as far as provision of financial services is concerned. As a result, the study singled out efficiency and competition in the process of examining the nexus between digital financial inclusion and economic growth. Anchoring on this setting, the study sought to evaluate the interaction effect of both banking sector's efficiency and competition in digital financial inclusion - economic growth nexus using the Kenyan context.

1.1 Problem Statement

Economic growth in most countries of the world is vital since it determines the levels of productivity, employment, poverty, income, living standards among others. In Kenya, significant

reforms over past decades have aimed at ameliorating economic growth. According to the World Bank Group (2025), Kenya GDP growth was 4.5% in the year 2024 as compared to 5.6% in 2023 amid challenges such as poverty, inequality, youth unemployment, lack of quality jobs. transparency and accountability. As per the World Bank Group therefore, financial inclusion is one of the catalysts that not only spurs economic growth but also enhances employment, empowerment and eradication of poverty. As for Xi and Wang (2023), advancement of digital financial inclusion has immense benefits that encompasses availing of accessible, convenient, affordable financial products besides enhancing of the efficiency of financial services. Moreover, digital financial inclusion is termed as a gateway to sustainable development given that it aids in the attainment of thirteen out of seventeen SDGs (Tay et al., 2022). These include SDGs as 1 (no poverty), 2 (zero hunger), 3 (good health and wellbeing), 4 (quality education), 5 (gender equality), 6 (clean water and sanitation), 7 (affordable and clean energy), 8 (decent work and economic growth), 9 (industry, innovation and infrastructure), 10 (reduced inequalities), 11 (sustainable cities and communities), 13 (climate action) and 16 (peace, justice and strong institutions).

Globally, 1.4 billion people mainly comprising of the women and youth living in rural areas remain unbanked despite 76% of adult population owning accounts by the year 2021 (World Bank Group, 2022). Kenya is seen to command the lead in digital finance especially with her success in mobile money (United Nations Development Program, UNDP). In this regard therefore, most communities are still left behind despite 85% of the adults have access to financial services. According to FinAccess household survey of 2024 spearheaded by the CBK and other partners, formal financial access driven by digital technology increased from 83.7% in 2021 to 84.8% in 2024. In this survey, 52.6% in 2024 as compared to 23.6% in 2021 of Kenyans were found to use mobile money in their daily transactions signifying increased payment digitization. Despite this, the report pointed out that 9.9% of Kenyan adults remain financially excluded especially youth in rural areas (45.5%). This was mainly attributed to lack of identity cards (51.1%) and phone (64.1%). In terms of the counties, those most included financially as per the survey findings were Nairobi, Nyeri, Kirinyaga, Kiambu, Isiolo and Mandera. On the contrary, most excluded counties lists comprised of Turkana, West Pokot, Elgeyo Marakwet, Trans Nzoia, Migori and Narok. This study therefore sought to shade more light given that digital financial inclusion is one of the pillars for a country to attain economic growth especially in the modern era taking into considerations the banking sector's efficiency and competition.

First and foremost from empirical studies, a strong positive effect exists in the long run but none in the short run given financial inclusion on financial efficiency of G20 countries (Khan, Zafar, Okunlola, Zoltan, & Robert, 2022). On the contrary, there exists a negative relationship between financial inclusion and financial efficiency among Asian Countries (Le, Chuc, & Taghizadeh-Hesary, 2019). Secondly, while Hu, Zhang, and Chao (2019) reported nonlinear relationship, a positive relationship between financial efficiency and economic growth have been found by Diallo (2018) besides Pal and Bandyopadhyay (2022).Thirdly, financial competition and financial inclusion are positively linked according to Teimory, Sohaili, and Fattahi (2025) but only in the short and not long run (Chinoda & Mashamba, 2021). Lastly, despite lack of clear consensus given the relationship between financial competition and economic growth (Coccorese, 2017), studies by Okowa and Vincent (2022) also Liyanagamage (2021) have found a negative nexus with the latter researcher's result applicable only in the short run. Quite the reverse, there exists a positive relationship between competition and economic growth (Abuselidze, 2021; Banya & Biekpe, 2017; Ijaz, Hassan, Tarazi, & Fraz, 2020; Teimory et al., 2025). To fill the existing gap, the study

established the interaction effect of banking sector's efficiency and competition in the direct nexus between digital financial inclusion and economic growth among the Kenya's Western province County governments. The main aim of the findings was not only to contribute to the exiting literature and theoretical framework but also to aid the policy makers, financial sector and the key stakeholders in the economy. The remaining subsections comprises of section 2 (theoretical framework and hypotheses development), 3 (research design and methodology), 4 (research findings and discussions), 6 (conclusion) and 7 (implications and recommendations).

2.0 Theoretical Framework and Hypotheses Development

The study was guided by Joseph Schumpeter's theory of economic development. The theory posit that economic development occurs as a result of new combinations arising from innovations or technological advancements (Schumpeter & Swedberg, 2021). These innovations involve changes that aim to enhance profits while minimizing costs. They include new source of materials invention, modern methods production, introduction of new products, new market search, and setting up of new type of industrial organization. In most countries, the banking sector plays a crucial in introduction innovative financial services that meets the demands of different stakeholders in the economy. According to Xi and Wang (2023), digital financial inclusion involves numerous financial services arising from innovation. These include online fund, online insurance, online loan and mobile payments. In addition, digital financial inclusion fuels financial services access by all stakeholders through digital channels or platforms (Mpofu, 2024). Given the push for changes in economic system through financial innovations in the financial sector, the theory of economic development thus formed the basis of conceptualizing the interaction effect of banking sector's efficiency and competition in the relationship between digital financial inclusion and economic growth.

2.1 Digital Financial Inclusion and Economic Growth

Digital financial inclusion involves numerous efforts to develop the digital financial services so as to expand the access and reduce the cost of financial services (Yang et al., 2022) as well as availing to individuals, institutions (Lutfi et al., 2021), SMEs and limited income individuals (Xi & Wang, 2023), financially underserviced or excluded population segments (Mulili, 2022). Notably, research studies on digital financial inclusion concept has been on the rise (Neves et al., 2023) given its importance in the modern economies of the world (Van Niekerk & Phaladi, 2020). In China, Xi and Wang (2023) using provincial panel data between 2011 and 2017 and a sample size of 210 assessed the impact of digital financial inclusion on quality of economic growth. In this study, digital financial inclusion measures were digital financial coverage breadth and usage depth. On the other hand, quality of economic growth was assessed in terms of technological innovation, coordinated development, environmental protection, people's livelihood and openness to the outside world. From the findings, there was a positive impact of digital financial inclusion on economic growth quality especially in the Eastern regions.

Using cross country analysis, Shen et al. (2021) purposed to establish the relationship between digital financial inclusion and economic growth of 105 countries. The study used spatial data and techniques of 86 neighboring countries whereby digital financial inclusion index was computed based on both the World Bank and International Monetary Fund (IMF) data. In the end, economic growth was found to be positively and significantly affected by economic growth. Moving on, Ramesh Hegde and Guruprasad (2024) examined the nexus between digital financial inclusion and economic growth among 30 Asian countries using panel data for year 2014, 2017 and 2021. This

study estimated digital financial inclusion based on the global Findex metrics while economic growth was measured using GDP per capita income. While controlling inflation, employment and population growth, the study documented a positive correlation between digital financial inclusion and economic growth. As a result, there were higher per capita income reported by countries due to enhanced digital financial inclusion. In Bangladesh, impact of digital financial inclusion on economic growth was analyzed by Rahman et al. (2025) basing on the monthly data over year 2018 to 2021. The effect was analyzed using auto regressive distributed lag (ARDL) model. From the findings, there was a positive association between digital financial inclusion and economic growth represented by industrial production index.

In developing countries context, a study by Khera et al. (2021) aimed at assessing if digital financial inclusion unlocked growth of 52 countries during year 2011 to 2018. In this study, digital financial inclusion proxies were access to digital infrastructure, that is, mobile subscription per 100 people, percentage of population who has access to internet and the number of registered mobile money agents per 100,000 adults. Moreover, digital financial inclusion was measured based on the usage which included the percentage of adults who had mobile accounts, use internet to pay, use mobile phone to receive salary or wages as well as making utility payments. From the analysis of data collected, there was a positive association between digital financial inclusion and economic growth (GDP per capita). In Africa, Chinoda and Mashamba (2021) analyzed panel data for 2004 to 2018 of 20 countries and found a significant positive relationship between financial inclusion and economic growth in the long and not short run. In the same continent, Meniago (2025) examined panel data between 2010 and 2023 of 16 countries under the Sothern African Development Community (SADC) . From the analysis output, there was a positive relationship between digital financial inclusion and economic growth. In this regard, the study concluded that digital financial inclusion was the back bone in advancing economic growth.

Using panel data for year 2012 to 2020, Ugwuanyi et al. (2022) conducted a study among the 29 Sub Saharan countries. The main objective of their study was to ascertain the linkage between digital financial inclusion and economic growth. In their findings, there was a positive and significant nexus between digital financial inclusion and economic growth. Moreover, impact of both digital and traditional finance was positive in middle income countries. On the other hand, digital finance's impact was significant only in low-income countries under study. Using similar context, Chinoda and Kapingura (2024) examined the role of institutions and governance on the digital financial inclusion and economic growth nexus of 25 Sub Saharan countries. The study analyzed panel data covering 2014 to 2020 whereby digital financial inclusion was measured based on the access, penetration and usage indicators availed by digital financial services. These indicators were percentage of population with access to internet, mobile subscription per 100 people, number of registered mobile money agents per 100,000 adults and number of active mobile money agents per 1000 adults. The study found out that there was a positive and significant effect of digital financial inclusion indicators on economic growth. Based on these reviewed studies, the study purposed to test hypothesis H01; There is no significant relationship between digital financial inclusion and economic growth among the Kenya's Western province County governments.

2.2 Interaction Effect of Banking Sector's Efficiency

In general, efficiency irrespective of industry is significant (Aktaş & Ünal, 2015). Given the continuous rising competition in the modern era, firms seek to attain performance optimization

through minimal resource utilization (Ahmad, Khan, Senan, & Khan, 2022). According to Bhatia, Basu, Mitra, and Dash (2018), efficiency is simply ascertained by pairing the actual optimal results while Ahmad et al. (2022) termed it as the expression of the relationship between inputs and outputs in ratio form. In the latter definition therefore, efficiency is put forth as the ability to take full advantage of productivity in the firm by optimally combining the inputs and outputs proportions as to lessen production costs. In the banking sector, efficiency has been documented to be determined by different factors as non-performing loans ratio, loan to total assets ratio, bank size in Latin America (Jiménez-Hernandez, Palazzo, & Sáez-Fernández, 2019). In addition, Nasim, Nasir, and Downing (2024) using the context of developed (G7) and developing (E7) countries established the determinants of banking efficiency to comprise of exchange rate as well as price stability, uncertainty, monetary conditions, leverage and capital adequacy. In Ghana, cost efficiency in the banking sector was found to be determined by bank size, credit risk and operational cost while profit efficiency determinants are both the operational costs and credit risk (Sarpong & Winful, 2017). Basing on Organization for Economic Cooperation and Development (OECD) countries context, high income countries have a more efficient financial system as compared to middle and low income countries (Kaya, 2020).

From the existing literature, studies have been conducted given the digital financial inclusion and financial efficiency concepts. To begin with, Le et al. (2019) analyzed panel data for year 2004 to 2016 of 31 Asian countries as to assess the impact of financial inclusion on financial efficiency and financial sustainability. In their study, countries were divided into categories as high income (10), upper middle income (7) and low middle income (14) countries. From the analysis using feasible generalized least squares (FGLS), financial inclusion was found to favorably influence financial sustainability while negatively affecting financial efficiency. Khan et al. (2022) conducted their study among the G20 nations, that is, 15 developed and emerging economies during 2004 to 2017. The study aimed at examining the effect of financial inclusion on financial sustainability, financial efficiency, GDP and human development. In this regard therefore, financial inclusion was measured using the number of automatic teller machines (ATMs) per 100, 000 adults, bank branches per 100, 000 adults and loans with commercial banks. On the other hand, financial efficiency was ascertained based on the bank net interest margin, return on assets (ROA) and return on equity (ROE). While controlling for inflation, population growth and openness, the findings indicated that financial inclusion in the short run did not affect financial efficiency but the effect was positive in the long run.

Financial efficiency has been positively and significantly linked to economic growth (Diallo, 2018). In China, Hu et al. (2019) evaluated the effect of regional financial efficiency on economic growth. After analysis, the study documented the existence of a non-linear relationship between financial efficiency and economic growth. This implied therefore that financial efficiency promotes economic growth only when it reaches a certain level. Furthermore, a study was conducted by Pal and Bandyopadhyay (2022) analyzed data from 1984 to 2018 to evaluate the effect of financial inclusion on economic growth, financial development, bank's financial efficiency, financial stability and bank's profitability among the high, middle as well as the low income countries. Th study controlled for income inequalities, population growth, inflation and the gross fixed capital formation. From their findings, there exist a positive impact of financial inclusion on financial efficiency as well as all the other dependent variables. Besides analyzed as an independent variable, financial efficiency has been found to mediate the relationship between digital financial inclusion and green innovation in the study by (Li, Sun, Gao, & Cheng, 2023).

Given these studies therefore, the study sought to extent the direct effect relationship by testing hypothesis H02; Banking sector efficiency does not significantly moderate the relationship between digital financial inclusion and economic growth among the Kenya's Western province County governments.

2.3 Interaction Effect of Banking Sector's Competition

Competition in the financial sector has been lauded for enhancing innovation, quality of financial products as well as the financial services production efficiency (Claessens, 2009). According to Al-Qaisi (2018), banking sector competition is essential not only in driving innovation but also improving the markets, growth, productivity and accessibility of affordable finances. In the same breadth, competition affects the banking sector's efficiency besides the country's economic growth and development (Bruci & Bozdo, 2023). Consequently, researcher over time have established mixed results given the nexus between competition and economic growth. Basing on the banking sector, Coccorese (2017) points out that consensus lack in the theoretical and empirical literature given contribution towards economic growth under competitive environment. In Sri Lanka, Liyanagamage (2021) analyzed data for 1996 to 2018 to examine the effect of competition on economic growth. Despite that their study found a negative effect in the short run, there was a strong and positive effect in the long run between competition and economic growth. Empirical investigation by Abuselidze (2021) asserts that banking competition is crucial as it contributes to the country's economic growth.

In Europe, Ijaz et al. (2020) linked bank competition, financial stability and economic growth using 2001 to 2012 data of 38 countries. In the end, the study found out that economic growth and rise in financial stability is attained when there is low competition. In the African context, data analyzed from 2005 to 2019 by Banya and Biekpe (2017) relating to the selected frontier countries indicate a positive nexus between banking sector competition and economic growth. In Nigeria, a study by Okowa and Vincent (2022) used data for 2005 to 2019 to analyze the relationship between bank competition, concentration and economic growth among the big-8 banks. While bank concentration positively relates with economic growth, the study failed to establish the same results given competition. Teimory et al. (2025) investigated the effect of banking industry competition on both economic growth and financial inclusion among Economic Cooperation Organization (ECO) member countries. Data relating to year 2004 to 202 was analyzed and found that enhanced financial inclusion is attributed to high competition. The study thus concluded competition improvement and reduction of market influence as the best strategies that can advance financial inclusion. Given the empirical reviewed of studies that have linked financial competition to economic growth as well as to financial inclusion, the study pursued to fill the existing gap by testing H03; Banking sector competition does not significantly moderate the relationship between digital financial inclusion and economic growth among the Kenya's Western province County governments. Given both the banking sector efficiency and competition, the study in the end sought to test hypothesis H04; Banking sector efficiency and competition do not jointly moderate significantly the relationship between digital financial inclusion and economic growth among the Kenya's Western province County governments.

2.4 The Conceptual Framework

Figure I depict the digital financial inclusion (independent variable) which is proxied by account ownership and financial service use. On the other hand, the figure diagrammatically illustrates the

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economic growth (dependent variable), banking sector efficiency and competition (moderating variables) as well as population growth and inflation (control variables).

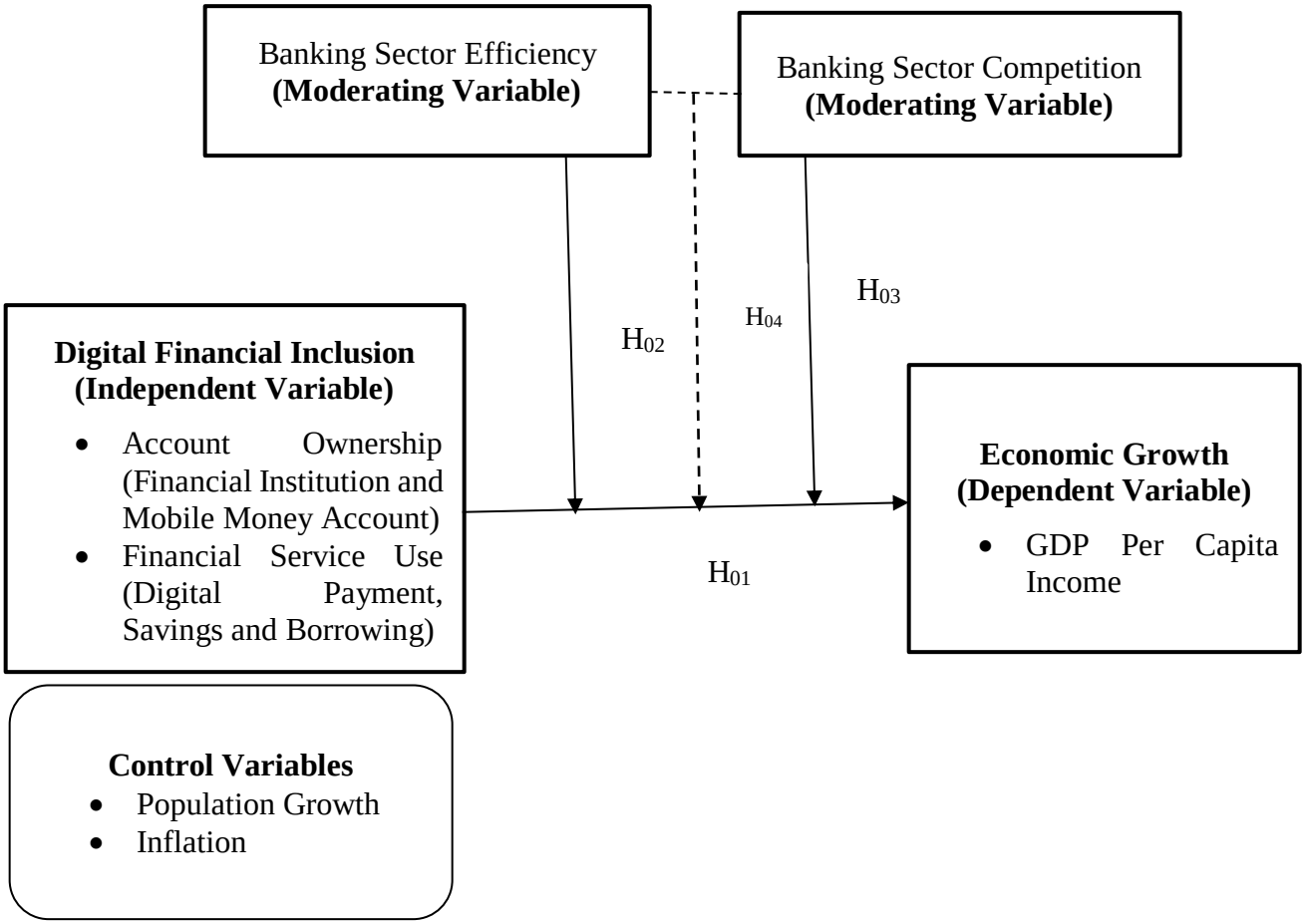

Figure I: The Conceptual Framework

3.0 Research Methodology

The study adopted a positivist research paradigm and employed a cross-sectional survey research design to collect data from the population at one particular point in time. The target population comprised 5,021,293 residents from four Western Province counties in Kenya (Bungoma, Busia, Kakamega, and Vihiga), from which a sample of 384 respondents was determined using the Krejcie and Morgan formula. Stratified sampling was used to ensure proportionate representation across counties, with simple random sampling employed within each stratum. Data was collected through structured questionnaires using a five-point Likert scale to measure digital financial inclusion based on account ownership and financial service use indicators adopted from the World Bank Group 2021 Global Findex database, while document analysis was employed to gather secondary data on banking sector efficiency, competition, economic growth, population growth, and inflation from official reports by the Central Bank of Kenya and Kenya National Bureau of Statistics. The collected data was analyzed using descriptive statistics (percentages, means, and standard deviations), Pearson correlation analysis, and hierarchical regression analysis through five sequential models to test the study's hypotheses. The regression models systematically

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examined the direct effects of digital financial inclusion on economic growth, the separate moderating effects of banking sector efficiency and competition, and finally the joint moderating effects of both variables on the relationship between digital financial inclusion and economic growth while controlling for population growth and inflation.

4.0 Findings and Discussions

A total of 384 questionnaires were distributed to the respondents out of which 313 (81.51%) were duly filled and returned for analysis. In Table IV, descriptive statistics relating to demographic characteristics of the respondents are presented. First and foremost, 180 (57.51%) were male as compared to 124 (39.62%) female respondents. In terms of age, most of the respondents were aged between 18 and 25 years (32.27%) with the least proportion being above 50 years (3.83%).

Table 1: Descriptive Analysis Results for Demographic Characteristics

Demographic Characteristic	Number of Respondents	Percentage Number of Respondents
Gender		
Male	180	57.51
Female	124	39.62
Other	9	2.87
Total (n)	**313**	**100**
Age Distribution		
18 to 25 Years	101	32.27
26 to 33 Years	86	27.48
34 to 41 Years	92	29.39
42 to 49 Years	22	7.03
Above 50 Years	12	3.83
Total (n)	**313**	**100**
Residence		
Urban	107	34.19
Rural	206	65.81
Total (n)	**313**	**100**
Education Level		
Primary	66	21.09
Secondary	141	45.05
Tertiary	82	26.20
None	24	7.66
Total (n)	**313**	**100**
Annual Income Level		
Low (Below $10,000)	233	74.44
Middle ($10,001 - $50,000)	71	22.68
High (Above $50,001)	9	2.88
Total (n)	**313**	**100**

Source: Field Data (2025)

From the findings in Table IV, huge number of the respondents (65.81%) resided in the rural areas whereby significant number (45.05%) reported to have attained the secondary followed by those with tertiary (26.20%) level of education. Despite this, 7.66% of the respondents remained without any education. Last but not least, only 2.88% of the respondents' annual income fell under the high-income level with the highest number (74.44%) fitting to the low-income level.

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Table 2: Descriptive Statistics for the Study Variables

Variable Description	Mean (M)	Standard Deviation (SD)
Digital Financial Inclusion (Independent Variable)		
Account Ownership		
Financial Institution Account Ownership	3.34	.505
Mobile Money Account Ownership	4.65	.614
Total (n)	**313**	
Financial Service Use		
Digital Payment	4.02	.576
Savings;		
Savings At Financial Institution	2.11	.312
Savings At Mobile Money Account	4.32	.581
Borrowings;		
From Financial Institution	3.56	.547
From Mobile Money Account	4.68	.634
Total (n)	**313**	
Moderating Variables		
Banking Sector Efficiency	1.19	.098
Banking Sector Competition	2.24	.188
Control Variables		
Population Growth	2.67	.202
Inflation	2.58	.197
Dependent Variable		
Economic Growth	3.39	.514

Source: Field Data (2025)

In the study, most account owners were those with mobile money account (M = 4.65, SD = .614). Under financial services use, digital payments had a M =4.02 and SD = .576 implying that respondents use mobile money, a debit or credit card, or a mobile phone to make a payment from an account besides the internet to pay bills or to buy something online or in a store in the past year. In the same breadth, most savings (M = 4.32, SD = .581) and borrowings (M = 4.68, SD = .634) are done using the mobile money account as compared to the bank or another type of financial institution. While the average economic growth was 3.39, banking sector competition had a slightly higher mean (2.24) as compared to efficiency (1.19). Lastly in Table V, there was a close tie given the average population growth (M = 2.67, SD = .202) and inflation (M = 2.58, SD = .197).

4.1 Correlation Analysis Results

From the Pearson correlation analysis, there was a strong and positive correlation between digital financial inclusion and economic growth (γ = .696, p< .05). This indicates that country's economy tends to grow as more people continue to gain access to and use digital financial services that result in digital financial inclusion. This was followed by the positive correlation banking sector efficiency and economic growth (γ = .473, p< .01). This indicates therefore that an efficient banking sector plays a crucial role in enhancing the economic growth. More importantly, the relationship between banking sector efficiency and competition was positive although was the least as shown by (γ = .109, p< .05). Thus, greater efficiency is attained as the competition in the banking environment increases.

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Table VI: Correlation Analysis

	EG	DFI	BSE	BSC
EG	1			
DFI	.696*	1		
BSE	.473**	.364**	1	
BSC	.295*	.412*	.109*	1

KEY; EG (Economic Growth); DFI (Digital Financial Inclusion); BSE (Banking Sector Efficiency); BSC (Banking Sector Competition); *Correlation significant at 0.05 ($p < .05$); **Correlation significant at 0.01 ($p < .01$).

Source; Field Data (2025)

4.2 Hypothesis Testing Results

Under Model 1, both population growth and inflation (control variables) under consideration explain 16.2 % of variation in economic growth as shown by R2 = .162, F = 10.356, p<.05. Within this model, there is a positive and significant relationship between population growth (β = .741, p = .002<.05) and economic growth. This findings are thus consistent with for Tartiyus, Dauda, and Peter (2015) as well as Bazaluk et al. (2025). On the contrary, there was a negative relationship between inflation (β = -.309, p-v = .017<.05) and economic growth hence in support of findings by Karki, Banjara, and Dumre (2020), Mandeya and Sin-Yu (2022). The nexus between economic growth, digital financial inclusion along with the control variables was tested in Model 2. In this case, R2 = .294, F = 39.616, p<.05 implies that all the variables in this model explained 29.4% variations in economic growth. In particular, ΔR2 of .211 indicate that digital financial inclusion account for 21.1% variations in economic growth while holding other variables constant. From this model, the relationship given population growth and inflation remained significant although their Beta coefficients declined to β = .563 and β = -.222 respectively. Further in tandem with the results by Chinoda and Kapingura (2024), Ramesh Hegde and Guruprasad (2024) the exist a positive β = .567 and significant (p .001< .05) linkage between digital financial inclusion and economic growth. This led to rejection of H01 and conclusion that there is a significant relationship between digital financial inclusion and economic growth among the Kenya's Western province County governments.

Table 3: Hypothesis Testing Results

	Model 1		Model 2		Model 3		Model 4		Model 5	
	β	p-v	β	p-v	β	p-v	β	p-v	β	p-v
PG	.741*	.002	.563*	.000	.340	.118	.193	.057	.092	.124
INF	-.309*	017	-.222*	.009	-.106*	.000	-.082	.214	-.041	.091
DFI			.567*	.001	.425**	.005	.321*	.019	.195**	.003
BSE					.392*	.000			.214**	.000
DFI*BSE					.257**	.008				
BSC							.188**	.000	.109	.135
DFI*BSC							.126*	.034		
DFI*BSE*BSC									.176*	.008
R^2	.162		.294		.475		.513		.654	
ΔR^2	.162		.211		.192		.081		.097	
F	10.356*		39.616*		54.091*		82.749*		109.623*	

Dependent Variable (Economic Growth)

https://doi.org/10.53819/81018102t3154

KEY; PG (Population Growth); INF (Inflation); DFI (Digital Financial Inclusion); BSE (Banking Sector Efficiency); BSC (Banking Sector Competition); *Significant at 0.05 ($p < .05$); **Significant at 0.01 ($p < .01$)

Source; Field Data (2025)

In Model 3, 47.5 % variations in economic growth were found to be explained jointly by the variables under consideration ($R2 = .475$, $F = 54.091$, $p <.05$). In line with this, the moderation (interaction of digital financial inclusion and banking sector efficiency) while holding other variables constant explains 19.2 % variations in economic growth. First and foremost, Model 3 findings indicate a positive and significant relationship between banking sector efficiency and economic growth ($\beta = .392$, $p = .000<.05$). This therefore support the findings by Diallo (2018), Pal and Bandyopadhyay (2022). Secondly, anchoring on this model, there was a positive ($\beta = .257$) and significant ($p = .008<.01$) moderating effect hence rejection of hypothesis H02. In the end, the study concluded that banking sector efficiency significantly moderate the relationship between digital financial inclusion and economic growth among the Kenya's Western province County governments.

The study then incorporated the second moderator (banking sector competition) in Model 4. Consequently, all the variable jointly in this model accounted for 51.3 % ($R^2 = .513$, $F = 82.749$, $p <.05$) variations in economic growth. The moderation process itself while holding other variables constant account for 0.81% variation in economic growth. Banking sector competition was found to positively ($\beta = .188$) and significantly ($p = .008<.01$) relate with economic growth thereby supporting the findings by Ijaz et al. (2020), Abuselidze (2021) and Teimory et al. (2025). The moderating effect of banking competition was then found to be not only positive ($\beta = .126$) but also significant ($p = .034<.05$). This led to rejection of hypothesis H_{03} and inference that banking sector competition significantly moderate the relationship between digital financial inclusion and economic growth among the Kenya's Western province County governments. To sum up, the R^2 of .654 in Model 5's findings implies that all the variables explained 65.4% while moderation process in this case accounted for 0.97% variation in economic growth. Out of the study variables in the model, only digital financial inclusion ($\beta = .195$, $p = .000<.01$) and banking sector efficiency ($\beta = .176$, $p = .000<.01$) remained significant. Likewise, hypothesis H_{04} was not supported thus concluding that both banking sector efficiency and competition jointly moderate positively ($\beta = .176$) and significantly ($p = .008<.05$) the relationship between digital financial inclusion and economic growth among the Kenya's Western province County governments.

5.0 Conclusion

The study aimed at assessing the moderating effect of both banking sector efficiency and competition in digital financial inclusion - economic growth nexus among the County governments in Kenya's Western province. Krejcie and Morgan (1970) formula was used to determine a sample size of 384 respondents from a target population of 5, 021, 293. Data was collected with the help of structured questionnaires and document analysis. Various analyses were conducted which include Pearson correlation, descriptive and hierarchical regression. At the outset, the study tested the first hypothesis and concluded that digital financial inclusion fosters economic growth given that the relationship was positive and significant. Under the second and third hypotheses, the separate interaction effect of banking sector efficiency as well as competition were found to be positive and significant. These interaction effects were however found to diminish the direct relationship found to exist between digital financial inclusion and economic growth. In the last

fourth hypothesis, a three-way interaction effect between digital financial inclusion, banking sector efficiency and competition was found to be positive and significant with economic growth among the Western province County governments in Kenya.

6.0 Implications and Recommendations

First and foremost, the study contributed to theory of economic development. This is because it examined the impact on economic growth given the interaction of banking sector efficiency as well as competition and the digital financial inclusion arising due to technological advancements or innovations. Secondly, the findings are essential to practice and policy making in various ways. To begin with, the study will be beneficial to the banking sector management in taking decisions that addresses the aspects of digital financial inclusion, that is, account ownership, financial services use. In the same breadth, attention will be directed towards enhancement of efficiency and participation in a competitive environment. It will aid policy makers in implementation of polices that supports population growth as it enhances economic growth. The policy makers will also be able to control inflation effectively as it negatively affects economic growth of the country. Moreover, polices will be put in place with the aim of strengthening digital financial inclusion, banking sector efficiency and competition. This is through investing in modern technologies to enlarge variety of digital financial services, amicable addressing of digital financial inclusion barriers, supporting efficiency through promotion of optimal resource utilization besides policies that advance healthy competition in the banking sector. Socially, the implications will occur given that the policies and improvements in the banking sector. As such, the society at large will be enlightened, access diverse, affordable and convenient financial services as a result of digital financial inclusion promotion. Furthermore, there will be rise in account ownership and financial services use which include savings, borrowings and digital payments. Lastly, having derived sample from four County governments in Western Province, future studies could consider enlarging this given that there are 47 Counties distributed across the eight provinces in Kenya. These studies could adopt different indicators given the study variables and analysis techniques rather than using hierarchical regression analysis. More importantly, other variables as governance, financial stability, socio economic factors, empowerment, diversity, unemployment, interest rates and balance of payment could be taken into consideration while analyzing the connection between digital financial inclusion and economic growth.

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